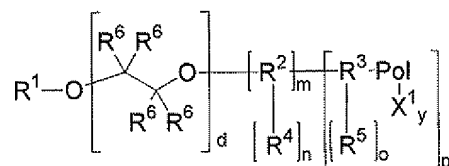
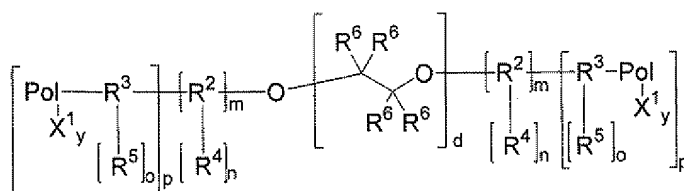


## Claims

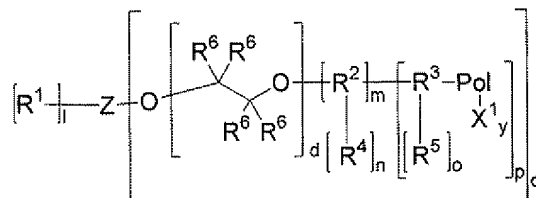
## 1. Polyvinyl polymer based on formulae IV, IVa and IVb



formula IV



formula IVa



formula IVb

in which

**Z** is a central atom and is an atom from groups 13 to 16 of the Periodic Table of the Elements, preferably carbon, silicon, nitrogen, phosphorus, oxygen or sulphur, more preferably carbon or silicon, or is an aromatic parent structure with at least four carbon atoms, in which one or more carbon atoms may be replaced by boron, nitrogen or phosphorus, with preferred aromatic or heteroaromatic parent structures deriving from benzene, biphenyl, naphthalene, anthracene, phenanthrene, triphenylene, quinoline, pyridine, bipyridine, pyridazine, pyrimidine, pyrazine, triazine, benzopyrrole, benzotriazole, benzopyridine, benzopyrazidine, benzopyrimidine, benzopyrazine, benzotriazine, indolizine, quinolizine, carbazole, acridine, phenazine, benzoquinoline, phenoxazine, which where appropriate may also

be substituted, or is a cyclic non-aromatic parent structure with at least three carbon atoms, which may also contain heteroatoms such as nitrogen, boron, phosphorus, oxygen or sulphur, preferred aliphatic parent structures being derivable from the cycloalkyl group, such as cyclopropyl, cyclobutyl, cyclopentyl, cyclohexyl, cycloheptyl, cyclooctyl or cyclononyl, or from the cycloheteroalkyl group, such as aziridine, azetidine, pyrrolidine, piperidine, azepane, azocane, 1,3,5-triazinane, 1,3,5-trioxane, oxetane, furan, dihydrofuran, tetrahydrofuran, pyran, dihydropyran, tetrahydropyran, oxepane, oxocane, or from the saccharides group, such as alpha-glucose or beta-glucose, and

$X^1$  is identical or different at each occurrence and is a halogen atom, preferably fluorine, chlorine, bromine or iodine, more preferably chlorine, bromine or iodine, and

$R^1$  is identical or different and is hydrogen or a  $C_1 - C_{20}$  group, and

$R^2$  is identical or different and is a bridging  $C_1 - C_{20}$  group between the central atom Z and the initiating unit [ $R^3-X^1$ ] or silicon or oxygen, and

$R^3$  is identical or different and is carbon or silicon, and

$R^4$  is identical or different and is a hydrogen atom or a  $C_1 - C_{20}$  group, and

$R^5$  is identical or different and is hydrogen or a  $C_1 - C_{20}$  group,

$R^6$  is identical or different and is hydrogen or a  $C_1 - C_{20}$  group, more preferably hydrogen or methyl, and

d is identical or different and is a whole natural number, and is a number between 5 and 100 000, and

l is a whole natural number and is zero, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19 or 20, and

m is identical or different at each occurrence and is a whole natural number, and is zero, 1, 2, 3, 4 or 5, and

n is identical or different at each occurrence and is a whole natural number, and is zero, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19 or 20, and

o is identical or different at each occurrence and is 1 or 2, and

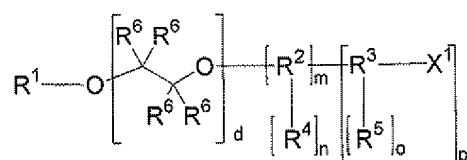
p is identical or different at each occurrence and is a whole natural number, and is 1, 2, 3, 4 or 5, and

q is a whole natural number and is 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19 or 20, and

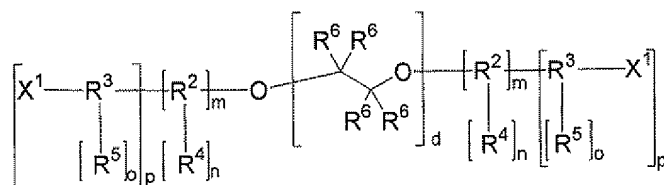
y can be identical or different, and is zero or one, and

Pol is a homopolymer or copolymer based on a polyvinyl ester, a homopolymer or copolymer based on a polyvinyl alcohol or a homopolymer or copolymer based on a polyvinyl acetal, more preferably polyvinyl butyral.

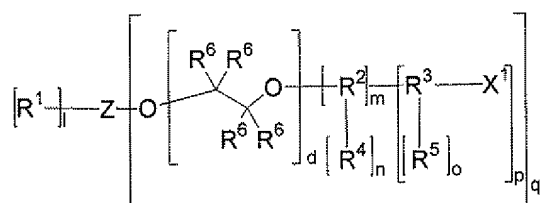
2. Polymer according to Claim 1, characterized in that Pol is a polymer based on polyvinyl acetate or polyvinyl butyral.
3. Polymer according to Claim 1, characterized in that Pol is a copolymer based on a polyvinyl ester with 1 or more 1-olefins having 4 to 20 carbon atoms.
4. Polymer according to Claim 1, characterized in that pol is a homopolymer based on polyvinyl acetate.
5. Polymer according to Claim 1, characterized in that Pol is a copolymer based on a polyvinyl acetate with 1 or more 1-olefins having 4 to 20 carbon atoms.
6. Use of the polymers according to Claims 1 to 5 as an adhesive component, emulsifier, detergent, lubricant, coating component, for electrically insulating magnetic wires, for producing laminated glass sheets, as an adhesive primer, for textile coatings, as an additive for motor fuels, engine oils, concrete, and in papermaking, for producing water-soluble films and for preparing biodegradable and water-soluble polymers.
7. Initiator systems, especially for preparing the polymers according to Claims 1 to 5, comprising at least one initiator of formula I, Ia or Ib, at least one metal compound of formula II and where appropriate at least one additive of the formula III:



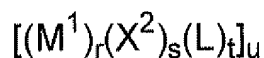
formula I



formula Ia



formula Ib



formula II



formula III

in which:

Z is a central atom and is an atom from groups 13 to 16 of the Periodic Table of the Elements, preferably carbon, silicon, nitrogen, phosphorus, oxygen or sulphur, more preferably carbon or silicon, or is an aromatic parent structure with at least four carbon atoms, in which one or more carbon atoms may be replaced by boron, nitrogen or phosphorus, with preferred aromatic or heteroaromatic parent structures deriving from benzene, biphenyl, naphthalene, anthracene, phenanthrene, triphenylene, quinoline, pyridine, bipyridine, pyridazine, pyrimidine, pyrazine, triazine, benzopyrrole, benzotriazole, benzopyridine, benzopyrazidine, benzopyrimidine, benzopyrazine, benzotriazine, indolizine, quinolizine, carbazole, acridine, phenazine, benzoquinoline, phenoxazine, which where appropriate may also be substituted, or is a cyclic non-aromatic parent structure with at least three carbon atoms, which may also contain heteroatoms such as nitrogen, boron, phosphorus, oxygen or sulphur, preferred aliphatic parent structures being derivable from the cycloalkyl group, such as cyclopropyl, cyclobutyl, cyclopentyl, cyclohexyl, cycloheptyl, cyclooctyl or cyclononyl, or from the cycloheteroalkyl group, such as aziridine, azetidine, pyrrolidine, piperidine, azepane, azocane, 1,3,5-triazinane, 1,3,5-trioxane, oxetane, furan, dihydrofuran, tetrahydrofuran, pyran, dihydropyran, tetrahydropyran, oxepane, oxocane, or from the saccharides group, such as alpha-glucose or beta-glucose, and

X<sup>1</sup> is identical or different at each occurrence and is a halogen atom, preferably fluorine, chlorine, bromine or iodine, more preferably chlorine, bromine or iodine, and

- $R^1$  is identical or different and is hydrogen or a  $C_1 - C_{20}$  group, and  
 $R^2$  is identical or different and is a bridging  $C_1 - C_{20}$  group between the central atom Z and the initiating unit [ $R^3-X^1$ ] or silicon or oxygen, and  
 $R^3$  is identical or different and is carbon or silicon, and  
5  $R^4$  is identical or different and is a hydrogen atom or a  $C_1 - C_{20}$  group, and  
 $R^5$  is identical or different and is hydrogen or a  $C_1 - C_{20}$  group,  
 $R^6$  is identical or different and is hydrogen or a  $C_1 - C_{20}$  group, more preferably hydrogen or methyl, and  
d is identical or different and is a whole natural number, and is a number  
10 between 5 and 100 000, and  
l is a whole natural number and is zero, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19 or 20, and  
m is identical or different at each occurrence and is a whole natural number, and is zero, 1, 2, 3, 4 or 5, and  
15 n is identical or different at each occurrence and is a whole natural number, and is zero, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19 or 20, and  
o is identical or different at each occurrence and is 1 or 2, and  
p is identical or different at each occurrence and is a whole natural number, and is 1, 2, 3, 4 or 5, and  
20 q is a whole natural number and is 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19 or 20, and  
 $M^1$  is identical or different at each occurrence and is a transition metal from groups 3 to 12 of the Periodic Table of the Elements, preferably chromium, molybdenum, ruthenium, iron, rhodium, nickel, palladium or copper, more  
25 preferably iron or ruthenium, and  
 $X^2$  is identical or different at each occurrence and is oxygen or a halogen atom, more preferably fluorine, chlorine, bromine or iodine, and  
L is identical or different at each occurrence and is a ligand, preferably a carbon-containing ligand such as methyl, phenyl, cymene, cumene, tolyl, mesityl,  
30 xylyl, indenyl, benzylidene, cyclopentadienyl or carbonyl, a nitrogen-containing ligand, such as triethylamine, tetramethylethylenediamine, pyridine, 2,2'-bipyridyl, substituted 2,2'-bipyridyl, 1,10-phenanthroline, phenylpyridin-2-yl-methylenamine, acetonitrile, substituted imidazolidine or terpyridyl, or a  
phosphorus-containing ligand, such as triphenylphosphine,  
35 tricyclohexylphosphine, bis(diphenylphosphino)ethane, bis(diphenylphosphino)propane or BINAP, and  
r is identical or different at each occurrence and is a whole natural number, and is 1, 2, 3, 4 or 5, and

s is identical or different at each occurrence and is a whole natural number, and is zero, 1, 2, 3, 4 or 5, and

t is identical or different at each occurrence and is a whole natural number, and is zero, 1, 2, 3, 4 or 5, and

5 u is a whole natural number and is 1, 2, 3, 4 or 5, and

M<sup>2</sup> is identical or different and is an element from groups 1 to 15 of the Periodic Table of the Elements, more preferably Li, Mg, Ti, B, Al, P or N, and

R<sup>7</sup> is identical or different and is hydrogen, a halogen atom or a C<sub>1</sub> – C<sub>20</sub> group, more preferably methoxy, ethoxy, n-propoxy or isopropoxy, and

10 v is identical or different and is a whole natural number, and is 1, 2, 3, 4, 5, 6, 7 or 8, and

w is identical or different and is a whole natural number, and is 1, 2, 3, 4, 5, 6, 7 or 8, and

x is a whole natural number and is 1, 2, 3, 4, 5, 6, 7 or 8.

15 8. Use of one or more initiator systems according to Claim 7 for preparing the polymers according to Claims 1 to 5.

9. Process for preparing the polymers according to Claims 1 to 5, characterized in  
20 that one or more initiator systems according to Claim 7 are used.